PART I - ADMINISTRATIVE

Section 1. General administrative information

Title of project

Coeur D' Alene Tribe Trout Production Facility

BPA project number: 9004402
Contract renewal date (mm/yyyy): 09/1999 ☐ **Multiple actions?**

Business name of agency, institution or organization requesting funding
Coeur d' Alene Tribe

Business acronym (if appropriate) CDA Tribe

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NPPC Program Measure Number(s) which this project addresses
10.8B.4 10.8B.20

FWS/NMFS Biological Opinion Number(s) which this project addresses

Other planning document references
Upper Columbia River Basin Draft Environmental Impact Statement (USDA 1997)
Status of the Interior Columbia Basin, Summary of Scientific Findings (USDA 1996)
Coeur d'Alene Lake Management Plan (IDEQ 1997)
IDFG Fisheries Management Plan, 1996-2000 (IDFG 1996)
Determination Status for the Columbia River Bull Trout (USFWS 1998)
Feasibility Report on Restoration of Coeur d'Alene Tribal Fisheries (UCUT 1985)
Coeur d'Alene Tribe Project Management Plan (BPA 1998)
Supplementation Feasibility Report (BPA 1998)
State of Idaho Bull Trout Conservation Plan (1996)
Report on Coeur d'Alene Lake (EPA 1977)
Agricultural Pollution Abatement Plan, Lake Creek Watershed (Kootenai-Shoshone Soil Conservation District 1991)
Lake Creek Watershed Assessment (EPA 1998)

Short description
Produce fish in support of on-going Coeur d'Alene Tribal fisheries enhancement projects. Complete Step 3-Final Cost Determination of the NPPC 3-step process, construct and begin hatchery operation. Evaluate effectivness of fish production facility.

Target species
Westslope cutthroat trout, Bull trout, Rainbow trout

Section 2. Sorting and evaluation

Subbasin
Coeur d'Alene Subbasin; Upper Columbia SubRegion

Evaluation Process Sort

CBFWA caucus	Special evaluation process	ISRP project type
Mark one or more caucus	If your project fits either of these processes, mark one or both	Mark one or more categories
☐ Anadromous fish ☒ Resident fish ☐ Wildlife	☐ Multi-year (milestone-based evaluation) ☐ Watershed project evaluation	☐ Watershed councils/model watersheds ☐ Information dissemination ☒ Operation & maintenance ☒ New construction ☐ Research & monitoring ☒ Implementation & management ☐ Wildlife habitat acquisitions

Section 3. Relationships to other Bonneville projects

Umbrella / sub-proposal relationships. List umbrella project first.

Project #	Project title/description
9004400	Implement Fisheries Enhancement Opportunities: Coeur d'Alene Reservation
9004401	Lake Creek Land Acquisition and Enhancement
9004402	Coeur d'Alene Tribe Trout Production Facility

Other dependent or critically-related projects

Project #	Project title/description	Nature of relationship

Section 4. Objectives, tasks and schedules

Past accomplishments

Year	Accomplishment	Met biological objectives?
1987	NPPC ammended the F&W Program to include baseline stream surveys of tributaries located on the Coeur d'Alene Indian Reservation.	
1990	Conducted field surveys of Reservation streams.	Documented location, accessability, stream gradient, and habitat potential of 21 streams within the Reservation boundaries.
1990	Completed annual report which assessed the enhancement potential of Reservation streams for westslope cutthroat and bull trout.	Ten tributaries were identified as having potential for habitat enhancement projects.
1991	Physical and biological surveys were completed on the ten tributaries identified for further study.	Surveys incorporated measures of bank and bed stability, riparian condition, land use, urbanization, migration barriers, water quality, stream flow, substrate suitability, channel modifications, relative fish abundance, and macroinverebrate densities.
1991	Used a modified Missouri method of evaluating streams in combination with information on biological indicators to select target tributaries for restoration and enhancement.	Of the ten tributaries determined to have potential for habitat enhancement four target tributaries (Alder, Benewah, Evans, Lake Creeks) were selected.
1992	Began using watershed assessment techniques to describe watershed processes and resource conditions in target tributaries on the Coeur d'Alene Indian Reservation.	Compiled information related to improving spawning and rearing habitat for each target tributary.
1993	Conducted baseline population evaluations for westslope cutthroat trout and macroinvertebrates in each target tributary.	Compiled population and biomass estimates for westslope cutthroat trout and calculated community metrics for macroinvertebrate populations.
1993	Identified limiting factors for westlope cutthroat and bull trout in target	Determined that stream temperature, base flow, and sediment were

	tributaries.	limiting cutthroat trout and bull trout abundance and distibution.
1994	Developed recommendations to improve and protect habitat while increasing numbers of westslope cutthroat and bull trout in target tributaries.	Recommendations included: Conduct habitat restoration in target tributaries, develop alternative harvest opportunities, purchase critical watershed areas, construct and operate trout production facility, implement monitoring and evaluation program.
1994	Recommendations of the Coeur d'Alene Tribe were adopted by NPPC.	NPPC ammended FWP objectives (10.8B.20).
1995	Priority areas for restoration were identified in the four target watersheds.	Used GIS technology to assist this task by overlaying information on riparian condition, fish population abundance and distribution, and land ownership.
1995	Initiated the first demonstration projects. Erected 2.8 km of exclusion fencing, installed bank protection structures, constructed pool habitat, and reestablished connections with historic floodplain channels at two locations.	Increased natural regeneration of riparian trees, shrubs and forbes by over 300% compared with adjacent grazed areas.
1995	Implemented the first compensatory harvest project by planting 1000 rainbow trout into Worley Pond.	Provided additional harvest opportunities to reservation community.
1996	Implemented additional demonstration projects. Erected 1.9 km of exclusion fencing, placed LWD in a 300 meter test reach, installed two current deflectors, and planted more than 9,000 trees and shrubs.	Achieved greater than 50% survival in upland revegetation treatments and increased native plant diversity by an average of 150% in riparian revegetation treatments.
1996	Maintained and stocked Worley Trout Pond with over 3000 rainbow trout.	Provided additional harvest opportunities to reservation community. Reduced fishing pressure on target tributaries by an estimated 2016 angler hours.
1997	Completed 5-year management plan for enhancement of Tribal fisheries.	Identified appropriate restoration techniques and projected anticipated program expenses for FY1997-2001.
1997	Continued project implementation. Constructed and enhanced 4 acres of wetland habitat, constructed a side-channel rearing pond, built a bio-revetment to protect 100 meters of streambank, and planted more than 9,000	Substantially reduced non-point source sediment pollution from over 100 acres of farmland. Achieved greater than 50% survival in upland treatments and increasing native plant diversity by an average of

	trees and shrubs.	100% in riparian treatments.
1997	Stocked Worley Pond with 2200 rainbow trout.	Provided additional harvest opportunities to reservation community.
1998	Constructed and enhanced 2 acres of wetland habitat and planted more than 9,000 trees and shrubs.	Substantially reduced non-point source sediment pollution from over 150 acres of farmland.
1998	Initiated a gravel study in known spawning tributaries of each target watershed to quantify the quality and quantity of available spawning gravel.	Results of the study will be published in annual reports.
1998	Collected over 400 individual tissue samples from 13 location to determine stock purity and relatedness of westslope cutthroat trout stocks.	Initial results from 4 locations indicate that tested stocks are 95% percent pure.
1998	Stocked of Worley Pond with 1400 rainbow trout.	Provided additional harvest opportunities to Reservation community.
1998	Coordinated field trips to restoration sites as part of Water Awareness Week during the past three years.	Provided hands-on experience in scientific applications to more than 500 students.
1998	Completed supplementation feasibility report for westslope cutthroat trout on Coeur d'Alene Indian Reservation.	Determined the need for supplementation of natural fish stocks in order to meet goals of NPPC and Tribe for harvestable numbers of westslope cutthroat trout in near future.
1998	Compiled comprehensive lists of landowner contacts in each of the target watersheds.	Signed 8 long-term easements to protect critical habitat in two target watersheds during the past three years.
1999	Completed 4 additional trout ponds for stocking in FY 2000.	Reduced fishing pressure on weak native stocks.
1999	Completed hatchery Master Plan.	Step 1 NPPC Hatchery Planning Process.
1999	Completed hatchery NEPA process	Step 2 NPPC Hatchery Planning Process.
1999	Completed genetic analysis of cutthroat trout in reservation waters.	Helped to determine where, how many and what types of fish to stock in Reservation waters.

Objectives and tasks

Obj 1,2,3	Objective	Task a,b,c	Task
1	Rear and release westslope cutthroat trout and bull trout into streams on the Coeur d'Alene Reservation in order to increase the numbers of fish spawning, incubating, and rearing in the natural environment while providing increased harvest opportunities.		
		a	Complete and submit final step of Council approved 3-step process for hatchery construction.
		a	Assist BPA with completing final design and cost determination for trout production facility.
		a	Submit Master Plan, NEPA, and final design for NPPC approval.
		b	Construct Hatchery
		b	1. Assist BPA with final constuction proposal.
		b	2. Seek bids for construction proposal.
		b	3.Let contract.
		b	4. Oversee constuction contractors and assist BPA with directing construction of the Coeur d'Alene Tribe Trout Production Facility.
		b	5. Coordinate cultural resource protection prior to and during construction of hatchery and satellite facilities with Coeur d'Alene Tribal Cultural Resources Department and BPA.
		c	Begin Hatchery Operations and Maintenance.
		c	1. Develop, increase, and reintroduce natural spawning populations of westslope cutthroat trout into waters within the Coeur d'Alene Indian Reservation.
		c	2. Rear and stock catchable sized rainbow trout for release into trout

			ponds
		c	3.Continue to provide personnel and materials necessary to maintain captive broodstock population and rear and release juvenile westslope cutthroat trout and catchable sized rainbow trout.
2	Monitor and evaluate the hatcheries effectiveness in increasing the numbers of fish harvested and returning to spawn in Reservation waters.		
		a	Conduct migration trapping study to enumerate juvenile outmigrants (hatchery vs wild) and assess adult returns, determine survival rates at each life stage, determine optimal stocking densities and release timing.
		a	Assess impacts of exotic species interactions with supplemented fish stocks in both Coeur d'Alene Lake and the target watersheds.
		b	Evaluate the effectivness of current harvest policies and enumerate hatchery contribution to creel.
		b	1. Provide a subsistence fishery of 0.5 fish/hour.
		b	2. Increase harvest opportunities consistent with harvest policies.
		c	Coordinate with other Coeur d'Alene Tribe Fish Water and Wildlife Projects. Monitor, review, and comment on other agency activity where supplementation has been planned and initiated.

Objective schedules and costs

Obj #	Start date mm/yyyy	End date mm/yyyy	Measureable biological objective(s)	Milestone	FY2000 Cost %
1	10/1999	9/2000	Complete environmental assessment. Construct hatchery Produce fish	Completed process for NPPC 3-step review. Constructed	90.00%

				Hatchery. Rear and release fish.	
2	10/1999	9/2000	Supplemented fish stocks returning to spawn	Harvestable surplus of target fish species	10.00%
				Total	100.00%

Schedule constraints
Hatchery construction is contingent on completing the Master plan, NEPA, and final design and cost determination on schedule.

Completion date
Hatchery construction scheduled for FY2000 and monitoring and evaluation will be on-going.

Section 5. Budget

FY99 project budget (BPA obligated):

FY2000 budget by line item

Item	Note	% of total	FY2000
Personnel	Project Supervisor, Project Biologist, Administrative Assisant Technicians, and cost share personnel	%11	170,000
Fringe benefits	41% of Salaries	%5	70,720
Supplies, materials, non-expendable property	Fish food, office supply, other supply, nets, etc.	%1	19,700
Operations & maintenance	Two Vehicles, Equipment Repair	%1	14,600
Capital acquisitions or improvements (e.g. land, buildings, major equip.)	Forklift, computer, automated water quality testing equipment,	%7	104,552
NEPA costs	Completed in FY1999	%0	0
Construction-related support	Construct Fish Hatchery	%64	1,000,000
PIT tags	# of tags:	%0	
Travel		%0	2,500
Indirect costs	31.6% of total	%8	131,645
Subcontractor	Disease, water qualty testing	%2	24,527
Other	Contingency, cost overuns	%1	15,000

TOTAL BPA FY2000 BUDGET REQUEST	$1,553,244

Cost sharing

Organization	Item or service provided	% total project cost (incl. BPA)	Amount ($)
		%0	
		%0	
		%0	
		%0	
Total project cost (including BPA portion)			$1,553,244

Outyear costs

	FY2001	FY02	FY03	FY04
Total budget	$601,000	$394,000	$439,000	$471,000

Section 6. References

Watershed?	Reference
☐	Beamesderfer, R.C. and B.E. Rieman. 1991. Abundance and distribution of northern squawfish, walleyes, and smallmouth bass in John Day reservoir, Columbia River. Transactions of the American Fisheries Society 120:439-447.
☐	Ellis, M.N. 1932. Pollution of the Coeur d'Alene River and adjacent waters by mine wastes. U.S. Bureau of Fisheries. Mimeo Report. 55p.
☐	Funk, W.H., Rabe, F.W., Filby, Royston, Bailey, Gary, Bennet, Paul, Shah, Kisher, Sheppard, J.C., Savage, N.L. Bauer, S.B., Bourg, A.C.M., Bannon, Gerald, Edwards, George, Anderson, Dale, Syms, Pat, Rother, Jane, and Seamster, Alan. 1975. An integrated
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☒	Graves, S., K.L. Lillengreen, D.C. Johnson, and A.T. Scholz. 1992. Fisheries habitat evaluation on tributaries of the Coeur d'Alene Indian Reservation: Annual Report, 1990. Project Number 90-044. Bonneville Power Administration. Portland, OR.
☐	Griffith, J.S. 1972. Comparative behavior and habitat utilization of brook trout (Salvelinus fontinalis) and cutthroat trout (Salmo clarki) in small streams in northern Idaho. Journal of the Fisheries Research Board of Canada 29:265-273.
☐	Griffith, J.S. 1974. Utilization of invertebrate drift by brook trout (Salvelinus fontinalis) and cutthroat trout (Salmo clarki) in small streams in Idaho. Transactions of the American Fisheries Society 103:440-447.
☐	Griffith, J.S. 1988. Review of competition between cutthroat trout and other

	salmonids. American Fisheries society Symposium 4:134-140.
☐	Idaho Division of Environmental Quality. 1997. Coeur d'Alene Lake Management Plan. Idaho Department of Health and Welfare, Division of Environmental Quality. Coeur d'Alene, ID.
☐	IDFG. 1996. Fisheries Management Plan, 1996-2000. Idaho Department of Fish and Game, Boise, ID.
☒	Kootenai-Shoshone Soil Conservation District. 1991. Agricultural Pollution Abatement Plan, Lake Creek Watershed. Final Planning Report. USDA Soil Conservation Service. Coeur d'Alene, ID.
☒	Krueger, E. 1998. Lake Creek watershed assessment. Environmental Protection Agency. 27p.
☒	Lillengreen, K.L., Tami Skillingstad, and Allen T. Scholz. 1993. Fisheries habitat evaluation on tributaries of the Coeur d'Alene Indian Reservation. Bonneville Power Administration. Division of Fish and Wildlife. Portland Or. Project # 90-44. 218p
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☒	Lillengreen, K., A.J. Vitale, R. Peters. 1998. Coeur d'Alene Tribe project management plan –enhancement of resident fish resources within the Coeur d'Alene Indian Reservation. Project Number 90-044. Bonneville Power Administration. Portland, OR.
☒	Lillengreen, K.L., D.C. Johnson, and A.T. Scholz. 1993. Fisheries habitat evaluation on tributaries of the Coeur d'Alene Indian Reservation: Annual Report, 1991. Project Number 90-044. Bonneville Power Administration. Portland, OR.
☐	Mallet, J. 1968. The Coeur d' Alene Lake fishery. Idaho Wildlife Review. May-June, 1969. 3-6 p.
☐	Marnell, L.F. 1986. Impacts of hatchery stocks on wild fish populations. Pages 339-347 in R.H. Stroud, editor. Fish culture in fisheries management. American Fisheries Society, Fish Culture Section and Fisheries Management Section, Bethesda, Maryland
☐	Marnell, L.F. 1988. Status of westslope cutthroat trout on Glacier National Park, Montana. American Fisheries Society Symposium 4:61-70.
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☐	NPPC. 1994. Columbia River Basin Fish and Wildlife Plan.
☐	Oien, W.E. 1957. A pre-logging invetory of four trout streams in northern Idaho. M.S. Thesis. University of Idaho. Moscow, Idaho. 92p.
☐	Peltier, J. 1975. Manners and Customs of the Coeur d' Alene Indians. News Review Publishing Company. Moscow, ID. 84 pp.
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	restoration of Coeur d'Alene Tribal Fisheries. Upper Columbia United Tribes Fisheries Center. Cheney, WA. 85 pp.
☐	Scott, O.A. 1968. Pioneer days on the shadowy St.Joe. Coeur d' Alene, Idaho.
☐	State of Idaho. 1996. Governor Philip E. Batt's Bull Trout Conservation Plan.
☐	USDA Forest Service, USDI Bureau of Land Management. 1996. Status of the Interior Columbia Basin, Summary of Scientific Findings. USDA, Forest Service, General Technical Report PNW-GTR-385. Portland, OR.
☐	USDA Forest Service, USDI Bureau of Land Management. 1997. Upper Columbia River Basin Draft Environmental Impact Statement. USDA, Forest Service, Washington, D.C.
☐	USDA Soil Conservation Service. 1981. Idaho Tree Planting Handbook. C.E. Mowry (ed.). USDA Soil Conservation Service, Boise, ID. 94 pp.
☒	USDA. 1989. Ponds - Planning, Design and Construction. USDA, Soil Conservation Service, Agricultural handbook Number 590.
☐	USFWS. 1998. Determination status for the Klamath River and Columbia River Distinct Population Segments of Bull Trout. USDI, Fish and Wildlife Service. Federal Register, 63(111). Pg. 31647-31674.
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PART II - NARRATIVE

Section 7. Abstract

The annual runs of anadromus salmon and steelhead are now extinct from traditional Coeur d'Alene Tribal fishing areas. This forced the Tribe to rely solely on the resident fish resources of Coeur d'Alene Lake. Subsequent declines in native salmonid fish stocks, in particular, westslope cutthroat trout (Oncorhynchus clarki lewisii) and bull trout (Salvelinus confluentus) in the Coeur d'Alene Basin caused the elimination of traditional subsistence fisheries by Coeur d'Alene Tribal members. Thus, the Coeur d'Alene Tribe Fish, Water, and Wildlife Program proposes to construct a trout production facility to supplement native fish stocks in tributaries located on the reservation, as well as, provide fish for an interim fishery in trout ponds. The principles, priorities and objectives for the Coeur d'Alene Trout production facility are described in the 1995 F&W Program (Section 10. Resident Fish paragraph 108B.20). This will be completed in conjunction with effective habitat restoration.

The Coeur d'Alene Tribe Trout Production Facility is intended to rear and release westslope cutthroat trout into rivers and streams with the express purpose of increasing the numbers of fish spawning incubating and rearing in the natural environment. It will use the modern technology that hatcheries offer to overcome the mortality occurring in lakes, rivers, and streams after eggs are laid in the gravel. Supplementation of native fish

stocks in conjunction with effective habitat restoration will be the primary means of achieving these biological goals.

Overarching goals for the program include: 1.) Protection, mitigation, and enhancement of Columbia River Basin native resident fish resources. 2.) Develop, increase, and reintroduce natural spawning populations of westslope cutthroat trout and bull trout into reservation waters. 3.) Provide both short and long-term harvest opportunities for the reservation community. 4.) Sustain long-term fitness and genetic integrity of targeted fish populations. 5.) Keep ecological and genetic impacts to non-targeted fish populations to a minimum.

Proposal specific goals are: 1.) Complete the 3-step process and get approval for hatchery construction as outlined by the NPPC F&W Program; 2.) Construct Coeur d'Alene Tribe Trout Production Facility; 3.) Begin operation phase; 4.) Develop and implement an effectiveness monitoring and evaluation program.

Section 8. Project description

a. Technical and/or scientific background

The Coeur d'Alene Indian Reservation encompasses 139,005 hectares (343,478 acres) in the panhandle section of north Idaho. Lake and stream resources form the heart of the Reservation and have shaped the Tribal culture from time immemorial. Coeur d'Alene Lake is the second largest lake in Idaho and is located within the 1,730,023-hectare (4,274,888 acres) Spokane River drainage basin. The target tributaries have a combined basin area of 34,853 hectares (86,123 acres) and include 529 kilometers (328 miles) of stream channel.

Declining native salmonid fish stocks, in particular, westslope cutthroat trout (Oncorhynchus clarki lewisi) and bull trout (Salvelinus confluentus) in the Coeur d'Alene Basin caused the elimination of traditional subsistence fisheries by Coeur d'Alene Tribal members. These declines were caused by construction of Post Falls Dam in 1906; major changes in land cover types from primarily forested areas to cover types with forests with recent and recovering clearcuts, agricultural and pasture lands, urban development, mining and open range land; and introduction of exotic fish species. The annual runs of anadromus salmon and steelhead are now extinct from traditional Coeur d'Alene Tribal fishing areas. Dams were constructed on the Spokane River at Monroe Street in the City of Spokane and Little Falls farther downstream which initially cut-off the anadromus fish runs from the Coeur d'Alene Tribe. These fisheries were further removed by the construction of Chief Joseph and Grand Coulee Dams. These actions forced the Tribe to rely solely on the resident fish resources of Coeur d'Alene Lake.

Based on the analysis of limiting factors, gains from habitat restoration and protection alone will not achieve the goals set forth by the Coeur d'Alene Tribal Council to provide for self-sustaining populations and harvestable numbers of salmonids, in particular, westslope cutthroat trout and bull trout. Thus, the Coeur d'Alene Tribe Fish, Water, and Wildlife Program proposes to construct a trout production facility to supplement native

fish stocks in tributaries located on the Reservation, as well as, provide fish for an interim fishery in trout ponds. These ponds, located around the Reservation, will provide harvest opportunities to the Reservation community while relieving fishing pressure on weak native salmonid fish stocks while restoration efforts take effect. Ponds will be constructed in isolated watersheds to eliminate the possibility of impacting any native fish populations. These conclusions are supported by work that was conducted previously by other investigators (Scholz et. al. 1985; Griffith 1974,1988; Marnell 1986, 1987, 1988; and Woods and Beckwith, 1995), as well as, work conducted by the Coeur d'Alene Tribe Fish/Water/Wildlife Program (Lillengreen et. al. 1993, 1996, and 1998).

The principles, priorities and objectives for the Coeur d'Alene Trout Production Facility are described in the NPPC 1995 F&W Program (Section 10. Resident Fish paragraph 108B.20). The Coeur d'Alene Tribe first proposed construction and management of a trout production facility in 1987. The NPPC approved construction of a trout production facility in 1995. Given the 1997 F&W Program moratorium on new fish hatchery proposals in the Pacific Northwest Region, construction of the approved trout production facility and management practices of the Coeur d'Alene Tribe will be planned and coordinated consistent with the 3-step process of the Councils current F&W Program. Upon completion of construction scheduled in FY 2000, the hatchery facility will provide the capacity for both trout production and rearing.

The Tribes dependence on both anadromus and resident fisheries is well documented. Peltier (1975) states that harvest of large salmon and cutthroat trout in the Spokane River, and bull trout from the lake contributed significantly to the Tribes overall subsistence needs. Subsequently, the large historical salmon runs were blocked from traditional fishing sites forcing the tribe to rely on resident fish stocks.

The decline in the resident fishery began when a traditional fish trap operated on the Coeur d' Alene River for over 50 years was inundated by construction of Post Falls Dam in 1906 (Scott, 1968 in Scholz et. al., 1985). However, harvest of local resident species continued for many years after that. Results from a study of Idaho lakes in 1967 show that the harvest of fish (total number of fish taken) from Coeur d' Alene Lake ranked second only to Pend Oreille Lake (Mallet, 1968). The fishing success reported in 1967 was due mainly to a large population of kokanee salmon (Oncorhynchus nerka Walbaum) an introduced species, residing in the lake. It was estimated that historically Coeur d' Alene tribal fishers caught around 42,000 cutthroat trout per year (Scholz et. al., 1985). This number had dropped dramatically by 1967 where only 3,329 cutthroat trout were caught (Mallet, 1968). In 1996, the number of cutthroat trout returning to spawn in reservation waters was one of the lowest ever recorded and in some tributaries the runs have long since vanished. Recent population estimates for westslope cutthroat trout in the four target watersheds indicate that more than 80 percent of available habitat supports less than 2.8 fish/100m^2, while the remaining headwater areas support populations that range from 2 to 15 times greater (Peters and Vitale 1998).

It appears that there are a number of factors that contributed to the decline of resident fish stocks within Coeur d'Alene Lake and its tributaries (Ellis 1932; Oien 1957; Mallet 1968;

Scholz et. al. 1985, Lillengreen et. al. 1993). Construction of Post Falls Dam in 1906, which inundated over 7 square kilometers of shoreline created habitat less suited for cold water salmonids. This rapid changing environmental condition allowed introduced exotics, and native species other than cutthroat trout to proliferate. This has been shown to be true in the Columbia River system where dam construction has altered the fish species composition and allowed northern pikeminnow (Ptychocheilus oregonensis Richardson) to effectively reduce the numbers of juvenile salmon migrating downstream (Beamesderfer and Rieman 1991).

Secondly, major changes in land cover types over the last 100 years has had a detrimental effect on the existing native salmonid populations. On private lands, agricultural and forest practices that failed to consider water resources have contributed to the degradation of water quality and habitat suitability for resident salmonids (Kootenai-Shoshone SCD 1991; Peters and Vitale 1998; Kreuger 1998). Increased sediment loads from agricultural runoff and recent and recovering clearcuts, and increases in water temperature related to riparian conopy removal have reduced the range of resident salmonids to a fraction of its historic extent. Within this new range, sediment has also reduced the quality of both spawning and rearing habitats.

Over 100 years of mining and the associated urban development along several of the tributaries in the Coeur d'Alene Basin have had negative effects on native salmonid populations. Effluent from tailings and mining waste contributed vast quantities of trace heavy metals to the system. These metals settled out and contaminated the bottom sediments. These metals when liberated during high flow events result in negative impacts on the resident fish population.

Historically, municipal waste contributed large quantities of phosphates and nitrogen that accelerated the eutrophication process in Coeur d'Alene Lake. This process creates an environmental condition less suited to native salmonids. Hayward and Margraf (1987) showed rapid successional changes in the species structure of fish as a result of trophic status changes in Lake Erie. However, over the last 25 years work has been completed to reduce the annual load of these materials (Woods and Beckwith, 1995). This may mean that conditions which favored salmonid populations historically may return, however, the successional changes may not mirror the response to eutrophication.

Finally, introduction of exotic fish species also contributed greatly to declines in the native salmonid fish stocks of the Coeur d'Alene Basin. Over 14 different exotic fish species have been introduced. Several of these (most notably northern pike (Esox lucius Linnaeus), largemouth bass (Micropterus salmoides Lacepede), kokanee salmon, chinook salmon (Oncorhynchus tshawytscha Walbaum), and eastern brook trout (Salvelinus fontinalis)) are known to have negative impacts on resident native salmonids. Two mechanisms are at work: interspecific competition, and species replacement. It has been shown that introduction of kokanee salmon will have detrimental effects on native cutthroat trout populations (Gerstung, 1988; Marnell, 1988). Marnell (1988) determined that declines in westslope cutthroat trout populations in lakes in Glacier National Park where kokanee were introduced were caused by competition for planktivorous food.

Cutthroat trout did not evolve with brook trout in the Coeur d'Alene Basin. Therefore, mechanisms that promote coexistence and resource partitioning have likely not developed. Griffith (1972) demonstrated that cutthroat trout fry emerge from the gravel later in the year than brook trout and, thus, age-0 cutthroat trout acquire a statistically significant length disadvantage that may continue throughout their lifetime. Such a size discrepancy may enhance resource partitioning, but in times of habitat shortage cutthroat trout may be at a disadvantage if they cannot hold territories against larger competitors. Thus, in less than optimal or degraded habitats it is likely that species replacement of native salmonid fish stocks with less desirable exotic species is occurring.

This proposal is for construction of a trout production facility to support the activities of the Coeur d'Alene Tribe Fish, Water, and Wildlife program. It is also the intent to follow the NPPC 3-step process. It should be understood that certain actions necessary for completion of the 3-step process have yet to be completed but are scheduled for completion in FY1999. Furthermore, before any of the activities related to this proposal are acted upon the tasks and objectives for FY1999 must be completed.

b. Rationale and significance to Regional Programs

Adfluvial cutthroat trout and bull trout are the target species for supplementation. They are species of special concern throughout the region. The status of westslope cutthroat trout as threatened or endangered over its entire range is currently under review by the U.S. Fish and Wildlife Service while Upper Columbia population segments of bull trout are listed as threatened under the Endangered Species Act.

Adfluvial production is considered the most important in the Coeur d' Alene basin and was chosen for supplementation because they attain the largest size and played an important role in the subsistence economy of the Coeur d'Alene Tribe. Adfluvial stocks will most likely have a competitive advantage over resident forms, when interacting with exotic fish species, because they move through many different habitats during their life history. Because adfluvial fish production is governed by a wide variety of physical, chemical, and biological influences populations should be more resistant to the changing conditions of the new sympatric lifestyle. Furthermore, adfluvial forms exhibit behavioral traits that are more apt to naturally re-found themselves in streams where adfluvial populations currently do not exist.

This project shares the NPPC Fish and Wildlife Program objectives (see section 10.1 NPPC F&W Program) of maintaining biological diversity in the Upper Columbia River basin; maintaining genetic integrity by preserving wild fish stocks; providing needed habitat protection; and increasing run sizes of resident fish populations by implementing effective restoration projects in conjunction with hatchery supplementation. The hatchery will provide fish for supplementation projects directed at increasing the biological diversity of species of special concern (cutthroat trout and bull trout). Stocks will be supplemented in the target tributaries according to strict guidelines developed for maximizing biological diversity and minimizing impacts to the naturally reproducing population. The genetic integrity will be maintained by using only fish that are not first-

generation hatchery for broodstock. Fish will be segregated and hatchery reared progeny will only be released into ancestral drainages. Less than 50% of the natural-origin returning adult escapement from each target tributary will be used for broodstock purposes. In addition, the proportion of natural-to-hatchery origin adults allowed to spawn naturally will be managed.

The Bonneville Power Administration has committed itself to protecting and enhancing the native fish resources of the Coeur d'Alene Indian Reservation as a means of partially mitigating impacts of the Columbia River Hydroelectric System. This project will address partial mitigation (in-place, out-of-kind) for anadromus fish losses in the Upper Columbia River basin through a resident fish substitution program. The Coeur d'Alene Tribe Trout Production Facility construction project is one of many ongoing efforts directed at mitigating losses attributed to construction of Grand Coulee and Chief Joseph Dams. The project is also an integral part of the Columbia Basin Fish and Wildlife Authority multi-year plan.

The Coeur d'Alene Tribe Fish, Water and Wildlife Program emphasizes implementation of the resident fish program on a watershed scale while promoting the conservation of natural genetic diversity and protection of unique stocks of native fishes located on the Reservation. The program focuses site specific restoration efforts on habitat determined critical in limiting life history stages regulating fish population structure and size. Fish populations will be supplemented accordingly in order to quickly re-establish populations in the newly reclaimed habitat.

c. Relationships to other projects

The Coeur d'Alene Tribe Fish, Water and Wildlife program, which this proposal is a part, is based on watershed management that equally protects and enhances fish and wildlife resources throughout the Reservation. The project will provide fish for reservation streams and the trout ponds based on results from other Coeur d'Alene Tribal program projects. Other program projects include:

Implement Fisheries Enhancement Opportunities: Coeur d'Alene Reservation (9004400)
The Coeur d'Alene Tribe is implementing habitat enhancement projects, managing interim harvest opportunities, and integrating restoration activities into local school curriculum (NPPC Program Measures 10.8B.4). The overall objectives are to increase production of resident westslope cutthroat and bull trout in four target watersheds by removing and mitigating the causes of habitat degradation. Off site harvest opportunities are provided to reduce pressure on target stocks and restoration activities are integrated with area schools to encourage future protection and enhancement.

Fish, Water, and Wildlife staff use watershed analysis techniques to identify priority areas for restoration by examining physical and chemical limiting factors, as well as abundance and distribution of target species. The analysis identified four watersheds on the Reservation for restoration efforts. These were the Lake Creek, Benewah Creek, Alder Creek, and Evans Creek watersheds.

Initial restoration plans developed in 1995 addressed fisheries habitat needs in the four target drainages. The plans called for passive restoration of habitat, using riparian exclosure fencing and active restoration using plantings, off-site water developments, and instream structures where appropriate. A Tribal fisheries management plan (1997) provides guidance for uniform evaluation, implementation and monitoring of projects. Projects planned for each target watershed are submitted to BPA for supplemental analysis under the watershed management program EIS. Enhancement progress is monitored by measuring standardized habitat variables at individual project sites and by tracking trends in population abundance and distribution. Participating landowners sign contracts to ensure long-term commitment to cost sharing, project maintenance and monitoring.

To date, fisheries restoration efforts in all watersheds have resulted in the construction and enhancement of six acres of wetland habitat and the planting of more than 17,000 native riparian trees and shrubs. In addition, protection easements have been secured for approximately 2.5 miles of riparian corridor. These activities will help contribute to the overall goal of maintaining and enhancing the integrity of the watersheds. The intent of this project is to restore degraded stream reaches and use fish from the facility to fully seed the newly reclaimed habitat in each of the four target drainages with desirable native fish species.

Lake Creek Land Acquisition and Enhancement (9004401)

This project is part of an ongoing effort by the Coeur d'Alene Tribe and the Bonneville Power Administration to protect, enhance, and maintain high value fish and wildlife habitat in the Lake Creek Watershed. The project involves the enhancement and long-term operation and maintenance of approximately 70 acres of emergent wetlands at the mouth of Lake Creek and 180 acres of associated forested/riparian wetlands. This area is one component of a recent 2100 acre acquisition that was funded by the Bonneville Power Administration to partially mitigate for resident fish and wildlife losses attributed to the Grand Coulee and Albeni Falls hydroelectric facilities. All activities on the project site complement ongoing habitat restoration work in the Lake Creek Watershed and help to establish a precedent for watershed management efforts on the Reservation. The enhancement and protection of wetland, riparian, and upland areas will provide measurable improvements in channel stability, sediment abatement, water quality, habitat availability, and suitability for wildlife and fish.

The Lake Creek watershed provides valuable habitat for populations of black bear, moose, elk, white-tailed deer, muskrat, Canada geese, mallards, bald eagles, black-capped chickadees, westslope cutthroat trout, bull trout, and many species of song birds and other non-target wildlife species. Benefits to resident fish will partially mitigate for Coeur d'Alene Tribal subsistence losses related to the construction and operation of Grand Coulee Dam. A long-term monitoring and evaluation plan will be developed to assess habitat and species response to land management activities.

Water Resources

The EPA is working with the Water Resources Division of the Coeur d'Alene Tribe Fish, Water, and Wildlife program under sections 319 and 106 of the Clean Water Act to reduce non-point source pollution and to gather baseline water quality data in the four target watersheds. Implementation priorities for this program are 1.) The reduction of sediment outputs from agricultural sheet and rill erosion; 2.) The restoration of riparian zones and increasing of streambank canopy cover; 3.) The augmentation of base flows; and 4.) The mitigation of flow disturbances and sedimentation due to forest roads.

Additionally, local soil conservation districts have received State Agricultural Water Quality Program (SAWQP) grants to fund projects that reduce non-point source pollution from cropland erosion. The Kootenai-Shoshone Soil Conservation District recently enrolled 55% of the Lake Creek agricultural acreage within Idaho into the State Agricultural Water Quality Program (SAWQP). This commits watershed producers to a variety of agricultural BMP's including conversion to bluegrass. The majority of the contracts written are in their first two years of a five-year implementation plan. As the contracts are completed, the Lake Creek watershed should receive reduced sediment loads. Tribal Fish, Water, and Wildlife Program staff are coordinating fish and wildlife habitat restoration efforts with this agency so that critical areas receive priority treatment.

d. Project history (for ongoing projects)

In 1987, the NPPC amended the Columbia River Basin Fish and Wildlife Program to include baseline stream survey of tributaries located on the Coeur d'Alene Indian Reservation [section 903 (g)(1)(B)]. Initial work rated Reservation streams according to their potential for habitat development for westslope cutthroat trout and bull trout. Ten streams were selected for further study based on geographic location, potential for habitat improvement, road access, and stream gradient. Physical and biological surveys were conducted on the 10 selected streams. These surveys incorporated stream bank and bed stability, riparian condition, land use, urbanization, migration barriers, water quality, stream flow, substrate suitability, channel modification, relative abundance estimates, and macroinvertebrate densities. These physical and biological data were then combined to choose the four streams (Alder, Benewah, Evans, and Lake Creeks) that offered the best potential habitat and highest fish populations for further study.

Between 1992 and 1994 watershed assessments were initiated in the four target drainages. Parameters looked at included: number of pools, riffles, and secondary channels. In conjunction, large organic debris, riparian vegetation, land use and water quality were assessed. Substrate and percent fines were also used as habitat quality indicators. Biological assessments included trout population estimates, biomass estimates, individual stock assessments, and qualification and quantification of benthic macroinvertebrates. It was determined that in all four target streams base flow, temperature, and sediment are limiting the quality of trout habitat. Average annual base flows of less than 25% of annual flows (considered limiting) were reported in all streams. Temperatures above those values reported as optimal were recorded in each of the four

streams. Benewah and Lake Creeks recorded temperatures sufficient enough to cause avoidance and mortality. Non-point source sediment run-off is also considered limiting in all four drainages. Average % fines for all streams were above the recommended 10% fines value. It was determined that habitat degradation (a result of the cumulative effects of many land use practices), as well as, introduction of exotic salmonid fish species caused the extinction of bull trout and severely depressed the native populations of westslope cutthroat trout. These land use practices have altered the natural ecosystem processes in which the native fishes have evolved. This alteration has created conditions less favorable for native salmonids and more favorable for introduced exotics, as well as, less desirable native fishes.

In 1994, the NPPC adopted the recommendations set forth by the Coeur d'Alene Tribe to improve the reservation fishery. These actions included: 1.) Implement habitat restoration and enhancement measures in Lake, Benewah, Evans, and Alder Creeks; 2.) Purchase critical watershed areas for protection of fisheries habitat; 3.) Conduct an educational/outreach program for the general public within the Coeur d'Alene Indian Reservation to facilitate a "holistic" watershed protection process; 4.) Develop an interim fishery for tribal and non-tribal members of the reservation through construction, operation and maintenance of five trout ponds; 5.) Design, construct, operate and maintain a trout production facility; and 6.) Implement a five-year monitoring program to evaluate the effectiveness of the hatchery and habitat improvement projects. These principles, priorities, and objectives were adopted into the 1995 F&W Program (Section 10 Resident Fish). See paragraph 10.8B.20.

Watershed restoration planning and implementation efforts were initiated in 1995, with NEPA work delayed until 1996. Fragmented ownership of Reservation lands presents a particular challenge to restoration efforts. Tribal ownership represents less than 10 percent of the combined watershed area and private lots are generally less than 80 acres. Private lands are heavily managed and land use consists primarily of managed forest (53%), agriculture (25%), and grazed pasture (22%). For the most part, these agricultural and pasturelands represent lands that were converted from forested and wetland cover types. In one target watershed, for example, nearly 40 percent of formerly forested areas have been converted to other uses. Road density frequently exceeds 2 miles/square mile in all headwater areas. The first demonstration projects were initiated with the support of private landowners in 1995. On-going data collection efforts in combination with baseline information help to promote an adaptive management strategy (as described in section 2.2H of the NPPC F&W Program) in this project. Restoration treatments are currently being implemented in the target tributaries based on the limiting factor analysis in conjunction with existing data on land use and vegetation coverage. From these data a list of priority areas were identified and treatments are currently being completed in order to recommend the best alternatives to rebuilding a self-sustaining fishery for the Coeur d'Alene Tribe.

Ongoing monitoring projects including trout migration, habitat use and incubation successes, as well as, genetic analysis are providing data used to refine treatment priorities. A report describing the use of supplementation as means for speeding up the

natural recovery process was the culmination of analysis of these monitoring projects. This report detailed the limiting factors for production in both the target tributaries and Coeur d'Alene Lake and provided expected results related to restoration activities. Table 1 summarizes these findings.

Table 1 Limiting Factor Analysis Westslope Cutthroat Trout on Coeur d'Alene Indian Reservation.

Lillengreen et. al. (1998) determined that due to the persistence of adverse conditions in natal streams and Coeur d'Alene Lake, cutthroat trout populations are thought to be at least moderately damaged (i.e. average spawning escapements fall between the minimum viable population and the number of adults needed to produce 50% of the carrying capacity of the stream environment) for the following reasons:

- Stochastic events that result in increased mortality of embryo, fry, and juvenile lifestages (e.g. peak and extreme low flow events) have been exacerbated by land use practices during the last 60 years;
- Competition for limited space and food during base flow conditions cause displacement of juveniles into water quality limited stream reaches;
- Competitive interactions with introduced salmonids may result in replacement of native trout in Alder Creek and Benewah Creek;
- Water temperatures in the upper ten meters of the water column in Coeur d'Alene Lake exceed the optimum as described in the HSI for cutthroat trout;
- Sediment loading from tributaries in combination with large quantities of aquatic macrophyte growth and low dissolved oxygen concentrations in the hypolimnion promote conditions more favorable for introduced fish species in Coeur d'Alene Lake; and
- Competitive interactions with introduced species for food, living space, and through predation limit cutthroat trout in both the littoral and limnetic zones of Coeur d'Alene Lake.

The most significant conclusions were that habitat restoration and subsequent increases in natural production in themselves would not meet the long-term goals of self-sustaining westslope cutthroat trout populations with harvestable surpluses in the near future. Thus, it was determined that artificial supplementation of the cutthroat population would be necessary in order to immediately take advantage of habitat improvements resulting from restoration projects.

In support of these conclusions the following work, as well as continuation of the habitat restoration project, will be completed in FY1999. The NPPC 3-step process will be initiated with completion of the master plan. The following elements will be covered in the finished document. Factors limiting production of target species; expected project benefits; alternatives for resolving resource problems; how proposed production project will maintain or sustain increases in production; historical and current status of resident fish in the subbasin, current and planned management of resident fish in the subbasin; consistency with NPPC policies, USFWS recovery plans, etc. (as described in the 1995

NPPC F&W Program), with cost estimates for all project components (e.g. facility design and construction, operations and maintenance, and monitoring and evaluation).

Secondly, the genetic characteristics of westslope cutthroat trout occupying waters of the Coeur d'Alene Indian Reservation will be determined. This is a necessary activity since the results can influence the type and nature of future supplementation actions. Preliminary analysis determined that very little hybridization has occurred between the native westslope cutthroat trout and other hatchery or exotic salmonids in the Coeur d'Alene Basin. Other work, yet to be completed, will determine the relationships between life history types and among populations. A minimum of eight polymorphic microsatellite loci will be analyzed to assess the genetic relationship between resident and migratory life history forms. The genetic analysis will be completed by August 1999.

NEPA will also be completed in FY 1999. Working with BPA, the Coeur d'Alene Tribe will hire a contractor to conduct an environmental impact analysis and to document the results. The following areas will be addressed: Soils and geology, wetlands and floodplains, water quality and quantity; water rights, fish, wildlife, vegetation, endangered species, cultural resources, social and economic uses, and land use including visuals. The contractor will write all sections of the EA in a manner that satisfies standards established by the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act. The final product will be an Environmental Assessment and a record of decision.

Development of conceptual designs and costs of the trout production facility will be completed in FY1999. An aquacultural and structural engineer will be contracted to work with the tribe and the BPA to develop conceptual designs and costs for the trout production facility. Final product will be a conceptual design and cost estimate. This report will contain sections on development of criteria for hatchery systems including water supply, waste water handling, buildings, roads, and utilities.

A list of acceptable hatchery site locations will be developed. Tribal staff will determine a list of acceptable potential; sites utilizing developed criteria. These criteria are: Land ownership (Tribal land ownership preferred), access and available water source, accessibility and centralized location, large enough site to contain entire hatchery complex (compound, rearing ponds, out buildings etc.), electricity. Final product will be a recommendation for hatchery location with a priority list of suggested alternatives.

Finally in FY1999, the Coeur d'Alene Tribe will seek a consultation with the USFWS under section 10(a)(1)(B) of the Endangered Species Act. This will be in regard to construction, operation and maintenance of the trout production facility, as well as, all related activities conducted by the Coeur d'Alene Tribe concerning any and all endangered and threatened species. The issuance of this permit will be contingent upon the following: Any take will be incidental, all impacts will be mitigated for to maximum extent practicable, applicant will ensure that adequate funding will be made available for mitigation of impacts, the taking will not appreciably reduce the likelihood of survival

and recovery in the wild of species covered by the permit, and other measures specified by the services will be met.

e. Proposal objectives

The Coeur d'Alene Tribe Trout Production Facility is intended to rear and release westslope cutthroat trout and bull trout into rivers and streams with the express purpose of increasing the numbers of fish spawning, incubating, and rearing in the natural environment. It will use the modern technology that hatcheries offer to overcome the mortality occurring in lakes, rivers, and streams after eggs are laid in the gravel. The facility will also produce rainbow trout for stocking in local trout ponds for "put and take' fisheries.

Overarching goals for the program includes protect, mitigate, and enhance Columbia River Basin native resident fish resources. Develop, increase, and reintroduce natural spawning populations of westslope cutthroat trout and bull trout into Reservation waters. Provide both short and long-term harvest opportunities for the Reservation community. Sustain long-term fitness and genetic integrity of targeted fish populations. Keep ecological and genetic impacts to non-targeted fish populations to a minimum.

Proposal specific objectives:

Objective 1 Rear and release westslope cutthroat trout and bull trout into rivers and streams on the Reservation in order to increase the numbers of fish spawning, incubating, and rearing in the natural environment while providing harvest opportunities for the Reservation community.

Task 1.1 Complete the 3-step process with approved hatchery master plan, final NEPA documentation, and final hatchery design and cost determinations for NPPC approval.

The NPPC approved evaluation of a trout production facility in 1995. Given the 1997 F&W Program moratorium on new fish hatchery proposals in the Pacific Northwest Region, construction of the approved trout production facility and management practices of the Coeur d'Alene Tribe will be planned and coordinated consistent with the 3-step process of the NPPC's current F&W Program. The first two steps of the 3-step process (Master plan development, and NEPA on proposed action) will be completed in FY1999.
Product: Based on successful completion of the first two steps in FY1999 the third step will be completed in FY2000. The expected outcome will be a completed planning document with a hatchery master plan, completed NEPA documentation; final design plans with all associated construction specifications including final cost determinations.
Completion date: This task will be completed by May 2000

Task 1.2 Construct Hatchery

The following steps will be taken in order to complete hatchery construction.

1. Coordinate supplementation planning internally and with other Coeur d'Alene Tribe Fish, Water and Wildlife projects.

2. Participate in consultation with USFWS to address Section 7 terms and conditions for Coeur d'Alene Tribe Trout Production Facility and to acquire Section 10 permits as necessary.
3. Participate on production coordination committees (tribal, federal) to meet the recovery plan goals for resident bull trout re-introductions.
4. Oversee all activities and assist BPA with directing the construction of Central Incubation and rearing facilities and associated satellite facilities
5. Coordinate cultural resource protection prior to and during construction of hatchery and satellite facilities with Cultural Resources Department and BPA.
6. Complete wells and do thorough testing of them.
7. Evaluate and determine other project required construction needs (design modifications, etc). Seek appropriate construction bids for design modifications if needed and complete construction.

Product: Completed, certified, and operational Trout Production Facility. **Completion Date:** FY 2000

Task 1.3 Begin Hatchery Operation and Maintenance Phase

1. Acquire broodstock through available forums to insure broodstock availability at project start-up for each species.
2. Continue to provide personnel and materials necessary to rear and release juvenile and adult fish slated for production.
3. Prior to release from the hatchery, mark (CWT and/or Ad clip as necessary) to determine return rate for outplanted fish.
4. Implement Operation and Maintenance plan- Issues addressed include disease management, egg take, incubation rearing techniques, release techniques, adult collection for broodstock, broodstock source, and broodstock management.
5. Experiment with feeding regimes and feed types to optimally sized cutthroat and rainbow trout.
6. Segregate identified stocks by selecting broodstock for which the origin can be determined, and release hatchery-reared progeny only in ancestral drainages.
7. Use for broodstock only those fish that are not first-generation hatchery fish.
8. Operate the supplementation facility using appropriate mating procedures, naturalized environments, and numbers to reduce the possibility of extinction, loss of within- and between- population variability, and domestication selection.
9. Use less than 50% of the natural-origin returning adult escapement from each stock for broodstock purposes.
10. Manage the proportion of natural- to hatchery-origin adults allowed to spawn naturally.
11. Release acclimated juveniles into the reservation streams as well as, release catchable sized rainbow trout into designated catch-out trout ponds.

Product: Rear rainbow trout and stock in tribal catch-out trout ponds.
Rear and stock juvenile size cutthroat trout and bull trout into designated Reservation waters. **Completion date:** Ongoing for duration of project

Objective 2 Monitor and evaluate the hatcheries effectiveness in increasing the numbers of fish harvested and returning to spawn in Reservation waters.

Task 2.1 Enumerate the number of naturally produced migrating juveniles vs. hatchery produced juveniles.

1. Operate outmigrant traps to monitor outmigration of wild and hatchery adfluvial fish. Fish captured will be sub-sampled to collect data on length, weight and origin (hatchery or natural). Trap efficiency will be determined through mark and recapture of known numbers of juvenile trout.
2. Monitor resident fish species composition through snorkel count and/or electrofishing in index areas.

Product: Report containing information from migration traps including migration timing, number of hatchery vs. wild, habitat use by hatchery and wild fish. **Completion date:** Ongoing for duration of project

Task 2.2 Enumerate the number of migrating adults returning to spawn in Reservation waters.

1. Install and monitor upstream traps to enumerate returns.
2. Radio tag adult fish destined for return to treatment streams. As adult fish are detected and trapped at the weirs, radio tag and tack fish to determine movement pattern and length of time prior to spawning.
3. Conduct cutthroat trout redd count surveys in spawning area to determine spawner distribution. Collect biological information from population, as well as, determine origin.
4. Collect and analyze the creel census data obtained from tributaries and Coeur d'Alene Lake.

Product: Report containing migration timing, spawning locations, numbers returning, trapping efficiency, hatchery vs. wild, habitat use by wild and hatchery adults.
Completion date: Ongoing for duration of project first release in FY2001and first adult returns expected FY2004.

Task 2.3 Assess impacts of exotic species interactions with supplemented fish stocks in both Coeur d'Alene Lake and the target watersheds.

1. Monitor interactions between resident trout and outplanted fish, as well as, interactions with other biota and other species of concern where applicable, by outmigrant traps, snorkel surveys, and electrofishing in watersheds where fish populations have been supplemented.
2. Monitor interactions between outplanted fish and exotic species in Coeur d'Alene Lake. Conduct predator-pray analysis in littoral zones of Coeur d'Alene Lake affected by hydropower operations.

Task 2.4 Evaluate effectiveness of current harvest policies and enumerate hatchery contribution to creel.

1. Increase harvest opportunities for fishers consistent with requirements of genetic, natural production, and experimentation objectives.
2. Use selective and/or "status index harvest" policies to increase harvest opportunities for fishers.
3. Provide a subsistence fishery of 0.5 fish/hr in catch-out trout ponds.

4. Obtain rainbow trout creel condition factors ($K>152 \times 10^{-7}$)

Product: Report detailing makeup of creel with hatchery to wild comparisons
Completion date: Ongoing for duration of project first report in FY2002

Task 2.5 Maintain coordination with other tribal programs and activities.

1. Monitor, review, and comment on other agency activity in streams and watersheds where supplementation has been planned and take appropriate actions to protect watersheds crucial to the success of the project.

Product: Coordinated releases of hatchery fish
Completion date: Ongoing duration of project

Task 2.6 Monitor and review compliance with hatchery operations manual for all hatchery related activity.

1. Continue bacterial and viral sampling of adults during spawning operations.
2. Continue proper fish culture techniques.

Product: Complete hatchery production evaluation forms. Report containing disease testing results. **Completion date:** Ongoing for duration of project first report one year after operations begin.

The expected outcome of the project is:

1. Have supplementation fish return as adults in sufficient numbers to fully seed available habitat.
2. Have a reproductive rate of success that will contribute to the enhancement of the natural population while providing a harvestable surplus.

Expected benefits to the FWP include:

1. Promote the biodiversity and genetic integrity of species of special concern in the Upper Columbia Basin
2. Increased subsistence fishery opportunity for CDA Tribal members
3. Increased fishery opportunities for non-members
4. Fisheries results orientated hatchery programs rather than production orientated
5. Realize benefits to wildlife species in the affected area (potential forage base), and
6. Provide a coordinated fishery management approach within the Coeur d'Alene Reservation and other affected areas within the Upper Columbia River Sub-Region and Coeur d'Alene Basin.

The first juveniles will be released in 2002 with adult returns in 2004. The project plans to evaluate several generations of releases to obtain statistically significant results.

f. Methods

Hatchery Operation

The Coeur d' Alene Tribal Hatchery will use ground water that is essentially pathogen free. Eggs are to be incubated in vertical heath trays and treated as needed with formalin

(167 PPM) for fungus control. Feed training occurs in shallow troughs, while Capalano troughs are utilized for rearing until the fish reach (200-600) fish/pound, at which time they will be moved to outside rearing facilities. Outside rearing facilities consist of 10'X100' concrete raceways passing the appropriate volume of water. Fish will be reared to out-planting size in the raceways as described in the Hatchery Operating Manual/Plan. Rearing densities throughout the rearing cycle will not exceed industry standards cited in the Fish Hatchery Management Manual (Pieper et al. 1982) and will attempt to load at approximately 75% of the maximum loading densities cited by Burrows and Combs (1968).

Egg acquisition of Westslope cutthroat trout will be derived from free ranging brood stocks located within the boundaries of the Coeur d'Alene Indian Reservation. Broods are to be spawned at a 1:1 sex ratio. Male fish will be spawned and released post spawn, while female trout will be held at the facility for consecutive year spawning efforts. Fertilized eggs will be water hardened in iodophor (100 PPM). Bacterial and viral samples will be obtained from 60 fish during the spawning process and analyzed by an accredited Fish Health Center.

Feeding regimes will range from hourly feedings to twice daily, using both hand and automatic feeders. Feed types will include both semi-moist and traditional dry trout feeds. Automatic feeders will be utilized with a portion of the production in an attempt to lesson aggressive behavior to over-head disturbance and lesson fish densities during feeding in efforts to reduce fin nipping.

Out-planting into targeted Reservation tributaries will consist of westslope cutthroat trout (specific number to be determined) into target watersheds and 1000 kg of Rainbow trout into ponds (put-and-take). Stocking dates are to be determined by water temperatures, fish size at the hatchery, and predatory status at the releasing site. Stocking will be accomplished by trucking fish from the hatchery location to the stocking site in distribution trucks. Loading rates will range between 0.7-1.0 lb./gal. Anti-foaming agents and a 0.2 percentage saline solution will be utilized during the distribution process. Stocking location and number is determined by available habitat for cutthroat trout, while angler effort is considered for rainbow trout placed in pond facilities.

Monitoring and Evaluation

Coeur d'Alene Tribe Fish Water and Wildlife personnel realize that effective monitoring is critical to a successful adaptive management program. Effective monitoring determines whether the action completed achieved the objective. Since monitoring activities may overlap, they will be developed into an integrated plan. This monitoring plan will be revised and amended as part of the adaptive monitoring process. This adaptive management process is specifically recommended in section 2.2H of the 1994 NPPC F&W program.

In the face of scientific uncertainty, monitoring and evaluation will provide insight into the actual result of an action, as well as, explain the outcome in achieving predicted results. The Coeur d' Alene Tribal Fish, Water and Wildlife project biologists and managers will complete and initiate an integrated multi-level program for

supplementation. This program will ensure that strategies are implemented as intended, experimental studies provide reliable results, and that risks associated with uncertainties are contained. It also ensures efficiency, prevents duplication of efforts, and tracks progress towards meeting objectives. The monitoring and methods of the plan will consist of, but not be limited to, the following.

1) Quality control: monitoring the performance of the facility and their operators. Standards would be developed for all fish culture and data collection activities as part of the certification process required for the facilities. Monitoring procedures would be included in the operation manuals for all associated activities of the facility.

2) Product specification attributes: monitoring the Coeur d' Alene Tribal hatchery to determine whether the fish produced meet goals with respect to: fish health; morphology (size and shape); behavior; and survival.

3) Research monitoring activities: include measurements of performance in four main areas. These areas are: a) post-release survival (survival from time of release until the time the fish returns to spawn); b) reproductive success (number of offspring produced per spawner); c) long-term fitness (genetic diversity and long-term stock productivity), and d) ecological interactions (population abundance and distribution, growth rates, carrying capacity, survival rates, transfer of disease, and gene flow).

4) Monitoring of stock status: measurements of run size and escapement to determine whether harvest objectives are being met while aiding in natural production. Monitoring will provide information essential to track long-term performance and fitness of the fish population.

Implementation of the monitoring plan, annual review of the findings, and subsequent adjustment, as necessary, of the supplementation program objectives, strategies, assumptions, uncertainties, and risk analysis would complete the feedback loop that is essential to the success of the adaptive management process, and ultimately, the entire project.

g. Facilities and equipment

The facilities exact needs are not available until the final design is completed. Although, a design team consisting of technical personnel of Coeur d'Alene Tribe Fish, Water, and Wildlife, BPA, and others will assist in designing the components of the hatchery. Common hatchery designs consist of; shallow, deep and capalano trough inside rearing; 10' X 100' concrete raceways for outside rearing; 100% ground water supplied rearing water; back-up emergency generator; garage, hatchery building, fully equipped shop; forklift; motor vehicles; fish tanker truck; on-site residence and other equipment and supplies to operate a standard fish culture facility. The design team will work with final design engineers to integrate their ideas into the construction of the facility. Facility and equipment needs will be based on the outcome of their coordinated efforts.

h. Budget

Supplementation hatchery efforts for FY 2000 involve a high level of commitment to planning, implementation, and monitoring/evaluation activities. Staffing requirements include a hatchery manager, one full-time biologist, one full-time technician, 1-2 seasonal technicians and one half-time administrative assistant, plus cost shares with other projects for the program manager and fisheries project supervisor. Staff salaries and fringe benefits comprise 16% of the total budget. This line item covers administrative oversight, project supervision, and all other personnel costs incurred during the first year of operation.

Supplies, materials, and non-expendable property cover items related to covering most of the supply requirements for day to day operations including fish food, office supply, nuts bolts, block nets, etc. This comprises 1% of the overall budget.

This account covers costs associated with routine maintenance of motor vehicles, boats and motors, and equipment, including oil changes, repairs or service to the electroshockers, net repairs, as well as unforeseen repairs necessary to keep our equipment in efficient operating condition. Two vehicles are needed to service both the hatchery and any satellite facilities on a day to day basis. This comprises 1% of the overall budget.

Capital acquisitions include a forklift to move heavy items at the hatchery (fish food, portable raceways, pumps, etc.), a fish truck with all associated equipment for transporting large quantities live fish, and any automated water quality testing equipment needed to ensure large scale die-off from happening when hatchery is unattended (short duration). This includes temperature, turbidity, toxins (types to be determined), and level sensors. This comprises 7% of the overall budget.

Construction related costs comprise 64 % of the budget and includes all cost related to the construction phase of the project. This is to include well development, hatchery construction, and construction costs for any out buildings and satellite facilities needed for remote trapping and spawning.

The Fish, Water, and Wildlife Program is committed to ensuring that the most recent and accepted scientific procedures are being utilized during the implementation phase of this project. This commitment requires training be provided for technical staff. Travel will also be used to coordinate project with BPA, NPPC, CBFWA and other appropriate entities.

Indirect costs total 31.6% of the total budget minus the hatchery construction costs or 8% of the total budget.

Other subcontractual costs include disease testing of the fish reared and any water quality testing needed to certify the wells and unanticipated water quality problems during operation.

A 1% contingency and cost overrun estimate was added to ensure that all required elements of the project were completed on time.

Since none of the cost determinations have been made these are only estimates of what the total cost will be. Work completed in FY99 will detail exactly how much each individual aspect of the hatchery construction will be.

Section 9. Key personnel

Summary of Key Personnel

Name	Title	FTE/Hours	Experience
Kelly Lillengreen	Program Manager	Part time	9.5 years
Ron Peters	Fisheries Project Supervisor	Part time	9.5 years
Jeffery Jordan	Project Biologist	Full time	1.0 years
Unfilled	Hatchery Manager	Full time	N/A
Unfilled	Technicians (1-2)	Seasonal	

Resumes

Kelly Lillengreen

Education:

MS; Eastern Washington University, Zoology/Fisheries Management; 1993
BS; Eastern Washington University; Zoology; fisheries emphasis; 1989

Current Employer and Responsibilities
Coeur d'Alene Tribe; Fisheries Program Manager; 1994 to Present
In this position, she is responsible for oversight, coordination and implementation of all fisheries and wildlife projects undertaken by the Coeur d'Alene Tribe. Principle responsibilities include supervision of professional and technical staff, preparation of policy recommendation for Council Action, preparation and approval of implementation and monitoring plans, annual reports, and budgets.

Previous Employment:

Coeur d'Alene Indian Tribe; Fisheries Biologist; 1992 to 1994
Upper Columbia United Tribes; Research Associate; 1990 to 1992
Eastern Washington University; Research Assistant; 1988 to 1990

Expertise:
Mrs. Lillengreen has over nine years professional experience in the evaluation and management of aquatic and terrestrial ecosystems. In other positions, she has mapped fisheries habitat characteristics, studied fish population characteristics, benthic communities, conducted watershed analysis using Timber-Fish-Wildlife ambient monitoring methodologies, and evaluated the potential impacts of forest management practices on aquatic resources.

Technical Publications and Presentations:

Ashe, Becky L., K.L. Lillengreen, J.J. Vella, L.O. Clark, S. Graves, M.R. Barber, G. J. Nenema, A.T. Scholz. 1991. Assessment of the Fishery Improvement Opportunities on the Pend Oreille River: 1990 Annual Report. U.S. Department of Energy, Bonneville Power Administration. Project Number 88-66. March 1991.

Lillengreen, K., T Skillingstad, A.T. Scholz. 1993. Fisheries habitat evaluation in tributaries of the Coeur d'Alene Indian Reservation: 1992 Annual Report. U.S. Department of Energy, Bonneville Power Administration. Project Number 90-044. October, 1993.

Lillengreen, K., A.J. Vitale, R. Peters. 1996. Fisheries habitat evaluation on tributaries of the Coeur d' Alene Indian Reservation: 1993, 1994 Annual Report. U.S. Department of Energy, Bonneville Power Administration. Project Number 90-044. September, 1996.

Lillengreen, K., A.J. Vitale, R. Peters. 1998. Coeur d'Alene Tribe project management plan - enhancement of resident fish resources within the Coeur d'Alene Indian Reservation. *In press*: U.S. Department of Energy, Bonneville Power Administration.

Ron Peters

Education:
B.S.; Eastern Washington University; Zoology/Fisheries Management; 1987
M.S.: Eastern Washington University; Fish Pathology/Fisheries Management;1995

Current Employer and Responsibilities:
Coeur d'Alene Tribe; Fisheries Projects Supervisor; 5/1996 to Present
- Coordination and implementation of BPA funded harvest enhancement projects.
- Responsible for all aspects of water quality monitoring and analysis.
- Supervision of professional and technical staff
- Preparation and implementation of monitoring plans
- Preparation of quarterly and annual reports, and budgets.

Previous Employment:
Quinault Indian Nation; Fisheries Biologist; 1992 to 1996
Upper Columbia United Tribes; Research Associate; 1991 to 1992
Eastern Washington University; Research Assistant; 1989 to 1991

Expertise:
Mr. Peters has over nine years professional experience in the evaluation and management of aquatic ecosystems. In other positions, he was the lead technical person in charge of management of the Quinault River sockeye salmon run. His duties included collecting, recording, and interpreting information relating to the enhancement and preservation of

the Quinault River sockeye salmon run. He was also lead investigator in charge of the Quinault Indian Nation Water Quality Laboratory where primary duties included oversight of all activities, development of experimental design, quality control, and data analysis.

Technical Publications and Presentations:

Peters, R. 1994. Hydroacoustic estimate of escapement of Quinault River sockeye salmon. Presented to North Pacific International Chapter American Fisheries Society. March.

Peters, R. 1995. Ecological investigations into the life history of the nematode Eustrongylides sp. (Nematoda: Dioctophymatoidea) found in Franklin D. Roosevelt Lake, WA. M.S. Thesis. Eastern Washington University. Cheney, WA. pp. 83.

Lillengreen, K., A.J. Vitale, R. Peters. 1996. Fisheries habitat evaluation on tributaries of the Coeur d' Alene Indian Reservation: 1993, 1994 Annual Report. U.S. Department of Energy, Bonneville Power Administration. Project Number 90-044.

Lillengreen, K., A.J. Vitale, R. Peters. 1998. Coeur d'Alene Tribe project management plan - enhancement of resident fish resources within the Coeur d'Alene Indian Reservation. U.S. Department of Energy, Bonneville Power Administration. Project Number 90-044.

Peters, R. and A.J. Vitale. 1998. Supplementation Feasibility Report. U.S. Department of Energy, Bonneville Power Administration. Project Number 90-044.

Jeffery Jordan

Education:
BS; Eastern Washington University: 1998

Current Employer and Responsibilities
Coeur d' Alene Tribe of Indians; Tribal Biologist; August 1998- Present
Complete tasks related to Coeur d'Alene Lake shoreline habitat study
Complete tasks related to construction of Coeur d'Alene Tribe Trout Production Facility.
Supervision of technical staff
Preparation of annual workplans, annual reports, and budgets.

Previous Employment
Coeur d' Alene Tribe of Indians; Seasonal Technician; 1994- 1997
Upper Columbia United Tribes Fishier Research Center; Seasonal Technician; 1994-1998

Expertise:

Mr. Jordan has just completed his bachelors degree requirements. He has worked on several fisheries related projects for the Coeur d'Alene Tribe Fish, Water, and Wildlife Program. He has worked on several stream restoration projects, as well as, lake studies projects, and water quality monitoring projects. His work at the University included rainbow trout and kokanee salmon tagging, migration, and imprinting studies on Lake Roosevelt, WA.,

Angelo J. Vitale

Education:
B.S.; University of Idaho; Biology/Botany; 1991

Current Employer and Responsibilities:
Coeur d'Alene Tribe; Restoration Project Coordinator; 10/95 to Present
Coordination and implementation of BPA funded habitat restoration projects.
Supervision of technical staff
Preparation of annual implementation and monitoring plans,
Preparation of annual reports, and data reduction and analysis.

Previous Employment:
Integrated Resource Management; Project Scientist; 1995
EA Engineering, Science, and Technology, Inc.; Fisheries Scientist; 1991 to 1995
University of Idaho; Research Assistant; 1990 to 1991
Idaho State University; Research Assistant; 1988 to 1989

Certifications:
Designing and Negotiating Studies Using IFIM; 1993
Watershed Analysis Methodology; 1995
Wildlife Habitat Evaluation Procedures; 1997

Expertise:
Mr. Vitale has over nine years professional experience in the evaluation and management of aquatic and terrestrial ecosystems. In other positions, he has conducted instream flow analysis for site specific studies and basin wide projects, mapped fisheries habitat characteristics, studied fish population characteristics, conducted watershed analysis using Timber-Fish-Wildlife ambient monitoring methodologies, and evaluated the potential impacts of forest management practices on aquatic resources. He also has extensive experience identifying, mapping and interpreting plant community assemblages and conducting site specific surveys for candidate threatened and endangered wildlife species.

Publications and Presentations:
Peterson, C.R. and A.J. Vitale. 1989. Measuring the activity patterns of free-ranging animals with radiotelemetry. *American Zool.* 29(4):43A.

Lillengreen, K., A.J. Vitale, R. Peters. 1996. Fisheries habitat evaluation on tributaries of the Coeur d' Alene Indian Reservation: 1993, 1994 Annual Report. U.S. Department of Energy, Bonneville Power Administration. Project Number 90-044. September, 1996.

Vitale, A.J. 1997. Restoration planning and implementation: Using watershed analysis to identify effective restoration tools. Presented at Landscape Connections: Restoring Ecological Integrity in the Inland Northwest, Washington State University, Pullman, WA.

Lillengreen, K., A.J. Vitale, R. Peters. 1998. Coeur d'Alene Tribe project management plan –enhancement of resident fish resources within the Coeur d'Alene Indian Reservation. U.S. Department of Energy, Bonneville Power Administration. Project Number 90-044.

Peters, R. and A.J. Vitale. 1998. Supplementation Feasibility Report. U.S. Department of Energy, Bonneville Power Administration. Project Number 90-044.

Section 10. Information/technology transfer

1. The technical information resulting from this project (and its components tasks) will be distributed in the following ways:

a. Where applicable, task specific, annual reports will be submitted to Bonneville consistent with the contract requirements and Bonneville will distribute copies to all individuals and agencies on its mailing list.

b. Excerpted data will be appropriately formatted and submitted to the Northwest Aquatic Information Network (StreamNet) and made available to the public via the Internet.

c. As an element of the CDA Tribe, Fish, Water & Wildlife, the objectives and findings of this project will also be entered into the CDA Tribe home page on the Internet. The kind of information posted to the CDA Tribe home page will differ somewhat from that posted to StreamNet. Specifically, the CDA Tribe Internet site will contain more detailed and site-specific information than that in StreamNet, which has a regional perspective and therefore aggregates data in standardized units of larger geographic scope. Other disciplines, as well as, fisheries will be posted to the CDA Tribe site. StreamNet presently can not accommodate this.

d. The results of this study will also be presented and critiqued in a workshop hosted by the CDA Tribe, the "Project Annual Review". The Coeur d'Alene Indian Nation can be contacted for abstracts of presentations made at this workshop.

e. Information pertinent to monitoring natural production and ecological interactions of species targeted by the CDA Tribe will be incorporated into the appropriate species monitoring plans.

2. Dispersal of information regarding this project will be through other avenues, as well, as, annual reports submitted to Bonneville Power Administration. Other avenues

include Resident Fish Managers Project Review (CBFWA), periodic meetings with the IDFG, and public presentations in the NPPC process. Furthermore, significant results can be submitted to scientific journals, LSRCP programs review workshops, CBFWA Project Review Workshops. ESA and permit requirements may include submitting reports to USFWS for Section 10 Permitting, Biological Assessments, and Biological Opinions. Others include NEPA requirements, Brood Year Production Reports, Final Design Reports, and Construction Memorandums. Project cooperators meet regularly to exchange information and discuss project adaptations.

Congratulations!